

The opinion in support of the decision being entered today was **not** written
for publication and is **not** binding precedent of the Board.

Paper No. 16

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KEVEN G. VAN DUYN

Appeal No. 2002-1462
Application No. 09/507,799

ON BRIEF

Before ABRAMS, McQUADE, and NASE, Administrative Patent Judges.
ABRAMS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1-11,
which are all of the claims pending in this application.

We AFFIRM-IN-PART.

BACKGROUND

The appellant's invention relates to a gas turbine engine. An understanding of the invention can be derived from a reading of exemplary claim 1, which has been reproduced below.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Akgun <u>et al.</u> (Akgun)	5,163,809	Nov. 17, 1992
Forrester	5,403,148	Apr. 4, 1995
Lyon	5,456,576	Oct. 10, 1995

Claims 1-3 and 5 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Forrester.

Claims 1-3 and 5 also stand rejected under 35 U.S.C. § 102(b) as being anticipated by Akgun.

Claims 1-3 and 5-10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Forrester.

Claims 1-3 and 5-10 also stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Akgun.

Claims 4 and 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable

(Paper No. 13) for the examiner's complete reasoning in support of the rejections, and to the Brief (Paper No. 12) and Reply Brief (Paper No. 14) for the appellant's arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellant's specification and claims, to the applied prior art references, and to the respective positions articulated by the appellant and the examiner. As a consequence of our review, we make the determinations which follow.

Claim 1

A gas turbine engine disposed about a longitudinal axis, the gas turbine engine having a rotor and a stator, the rotor including a fan, the fan having a plurality of blades mounted thereon, the stator including a fan case disposed radially outward of the fan, wherein the improvement is characterized by:

a hardened liner disposed in the fan case to circumscribe the fan blades, said liner having an interior surface for minimizing the damage to the fan case during a fan blade loss condition by allowing the fan blades to skid along the interior surface of the liner and for precluding the embedding of the blades in the fan case to minimize unwanted torque loading of the fan case, with the hardened liner being harder than the fan blade tip material.

The guidance provided by our reviewing court with regard to the matter of anticipation is as follows: Anticipation is established only when a single prior art reference discloses, either expressly or under the principles of inherency, each and every element of the claimed invention. See, for example, In re Paulsen, 30 F.3d 1475, 1480-1481, 31 USPQ2d 1671, 1675 (Fed. Cir. 1994) and In re Spada, 911 F.2d 705, 708, 15 USPQ2d 1655, 1657 (Fed. Cir. 1990). Anticipation by a prior art reference does not require either the inventive concept of the claimed subject matter or recognition of inherent properties that may be possessed by the reference. See Verdegaal Brothers Inc. v. Union Oil Co. of California, 814 F.2d 628, 633, 2 USPQ2d 1051, 1054 (Fed. Cir. 1987). Nor does it require that the reference teach what the applicant is claiming, but only that the claim on appeal "read on" something disclosed in the reference, *i.e.*, all limitations of the claim are found in the reference. See Kalman v. Kimberly-Clark Corp, 713 F.2d 760, 772, 218 USPQ 781, 789 (Fed. Cir. 1983), *cert. denied*, 465 U.S. 1026 (1984).

Independent claim 1 stands rejected as being anticipated by Forrester. This reference discloses a ballistic barrier for containing within the casing a fan blade that has been released. While it is not directed to solving the precise problem to which the

Forrester discloses a gas turbine engine disposed about a longitudinal axis and having a rotor and a stator with the rotor including a fan having a plurality of blades and the stator including a fan case disposed outwardly of the fan. Forrester further discloses a hardened liner (barrier) 20, which can be on the forward or aft section of the casing as well as other regions of the engine (column 4, lines 22-26). Forrester describes the liner in the following manner:

According to the present invention, there is provided a protective barrier for the containment casing of turbomachinery, such as a gas turbine engine. More specifically, the barrier is positioned on the interior surface of the containment casing to serve as a ballistic barrier in the event that a blade of the turbomachinery is released. Preferably, and particularly in the case of a turbofan engine, the barrier is positioned in the region axially forward of the fan, and serves to minimize the damage to the forward section of the containment housing when the blade is released and propelled in a forward direction from the fan. The barrier is formed of a material which is sufficiently hard to resist the impact of the fan blade. The barrier serves to deflect and distribute the force of the impact, such that the containment casing is more readily able to withstand a highly localized impact delivered by a corner of the blade. The barrier also serves to dull the fan blade upon impact, so as to further minimize the damage inflicted by the fan blade to the containment housing. Column 2, lines 36-55.

An advantage of the present invention is that the tiles [which comprise the liner] are formed from a hard material, such as a ceramic composite, which promotes the ability of the tiles to distribute the highly localized impact inflicted by a fan blade. Preferably, the tiles are also sufficiently

the impact of the fan blade 12 and resist the cutting action of the fan blade 12. Column 4, lines 36-40.

It is clear from the above that Forrester's liner is sufficiently hard so as to resist the impact of a fan blade, to resist puncture by a corner of a fan blade, to resist cutting action of the blade, and to dull the fan blade upon impact. This being the case, it is our view that, referring to the language of claim 1, the Forrester liner has an interior surface that minimizes damage to the fan case during a blade loss condition, will allow the fan blades to skid along its surface, will preclude the embedding of the blades in the fan case to minimize unwanted torque loading of the fan case. It follows that to be capable of performing in this manner, the liner must be harder than the fan blade tip material.

We thus conclude that all of the subject matter recited in claim 1 is disclosed in Forrester, and the claim is anticipated thereby. The Section 102 rejection of claim 1 as being anticipated by Forrester is sustained, as is the like rejection of claim 2, which the appellant chose to group with claim 1 and with regard to which has not argued separate patentability.

The appellant argues that Forrester deals only with released fan blades and does not recognize torque loading as a problem. We agree. However, it is our view

Claim 3 sets forth essentially the same subject matter as claim 1, except that the hardened liner is “segmented.” Forrester states that the liner of his invention “is formed by securing a number of tiles” to the interior surface of the casing, therefore meeting the requirement in claim 3 that the liner be segmented. The Section 102 rejection of claim 3 as being anticipated by Forrester is sustained.

We reach the opposite conclusion, however, with regard to dependent claim 5, which adds to claim 1 the requirement that there be a radial zone of interaction between the hard liner and the fan blade tips “such that during a high rotor imbalance condition the fan blades skid along the interior surface of the hardened liner as opposed to embedding in the fan case.” This feature is explained on pages 4 and 7 of the appellant’s specification. While Forrester is concerned with preventing the blade from becoming embedded in or cutting the liner, from our perspective the reference teaches only that this is accomplished by virtue of the strength of the material used for the liner, for there is no teaching of correlating the space between the liner and the blade tips with the solution to the problem of minimizing the damage caused by fan blade loss. The Section 102 rejection of claim 5 on the basis of Forrester is not sustained.

Claim 1 also stands rejected as being anticipated by Akgun. This reference

metal such as Inco X-750 or Inco 600 which strengthens the engine case “in order to prevent any separated members from passing through the engine case and beyond” (column 1, lines 24-26), by “absorbing the energy of impacting debris” (column 2, lines 63 and 64). As was the case with Forrester, it is our view that in order to accomplish the functions recited by Akgun viz-a-viz a blade loss condition, the liner also would be capable of performing in accordance with the requirements of claim 1. We therefore will sustain the Section 102 rejection of claim 1 as being anticipated by Akgun, and along with it the rejection of claim 2, which has been grouped with claim 1.

With regard to claim 3, Akgun’s liner comprises a spiral wound band, and therefore clearly does not meet the requirement of claim 3 that the liner be segmented, that is, divided into segments or sections. In fact, the spiral winding is a key feature of the Akgun invention (column 1, lines 40-47; column 2, line 42 et seq.). The Section 102 rejection of claim 3 on the basis of Akgun is not sustained.

Nor will we sustain the Section 102 rejection of claim 5 based on Akgun, for the same reasons as were set forth above with regard to the Forrester rejection of claim 5.

The Rejections Under Section 103

The test for obviousness is what the combined teachings of the prior art would

ordinary skill in the art would have been led to modify a prior art reference or to combine reference teachings to arrive at the claimed invention. See Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Int. 1985). To this end, the requisite motivation must stem from some teaching, suggestion or inference in the prior art as a whole or from the knowledge generally available to one of ordinary skill in the art and not from the appellant's disclosure. See, for example, Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1052, 5 USPQ2d 1434, 1439 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988).

Claims 1-3 and 5-10 stand rejected as being unpatentable over Forrester. In our consideration of the Section 102 rejections, we concluded that the subject matter of claims 1-3 was anticipated by Forrester. Anticipation being the epitome of obviousness (see In re Fracalossi, 681 F.2d 792, 215 USPQ 569 (CCPA 1982)), we will sustain the rejection of claims 1-3 on the basis of Forrester.

With regard to claim 5, we now consider Forrester in the context of a rejection under 35 U.S.C. § 103. As we pointed out above, there is no express teaching in Forrester of providing a radial zone of interaction which is of such distance as to allow the blades to skid along the interior of the liner as opposed to embedding in the fan

provide such a zone. This being so, Forrester does not establish a prima facie case of obviousness with regard to the subject matter recited in claim 5, and we will not sustain the Section 103 rejection of claim 5 as being unpatentable over Forrester.

Forrester also does not establish a prima facie case of obviousness with regard to the subject matter recited in claim 6, which sets forth a radial zone of interaction that extends for a distance less than one hundredth of the fan case diameter. While we would agree with the examiner that some clearance zone must be present between the ends of the blades and the inside surface of the casing, we are not persuaded by the evidence adduced by the examiner and the rationale advanced on pages 7 and 8 of the Answer that the claimed ranges are old and well known in the art, or “workable ranges” in the art, by which we assume the examiner means are result effective variables. The same can be said for the ranges recited in dependent claims 7 and 8.

The Section 103 rejection of independent claim 6 based upon Forrester is not sustained. Nor, it follows, will we sustain the like rejection of dependent claims 7-10.

Claims 1-3 and 5-10 also stand rejected as being unpatentable over Akgun. We will sustain this rejection of claims 1 and 2 on the basis that we have decided above that Akgun anticipated the subject matter recited in these claims, and anticipation is the

taught by Akgun, and we fail to perceive any teaching, suggestion or incentive in Akgun which would have led one of ordinary skill in the art to so modify the invention therein disclosed. The rejection of claim 3 as being unpatentable over Akgun is not sustained.

We will not sustain the Section 103 rejection of claims 5-10 on the basis of Akgun for the same reasons as were provided above with regard to the rejection of these claims as being unpatentable over Forrester.

Claims 4 and 11 stand rejected as being obvious in view of the combined teachings of Forrester and Lyon. Claim 4 depends from independent claim 3, which we found above to be unpatentable over Forrester, and adds to its parent claim the requirement that the segmented liner include a plurality of plate shingles circumferentially disposed in the fan case, with each being offset from adjacent shingles and forming an overlap region between adjacent shingles. Lyon discloses tiles that are overlapped in order to allow relative movement in response to the action of backing springs which bias the tiles toward the ends of the fan blades for the purpose of constantly maintaining a minimal tip clearance between the tips of the blades and the liner in the face of changing operating conditions in the engine. See column 1 and column 3, lines 1-6. Lyon mentions nothing about the effect upon this system if blades

Forrester tiles with the overlapping tiles disclosed by Lyon. We therefore will not sustain the rejection of claim 4.

Claim 11 adds the same structure to claim 6 (via claim 10). We refused to sustain the Section 103 rejection of claim 6 based upon Forrester because the reference failed to disclose or teach the claimed radial zone of interaction. As was the case with claim 4, we find suggestion to combine Lyon with Forrester to be lacking. However, even if suggestion to do so were to exist, the teachings of Lyon would not, in our view, overcome the the deficiency in Forrester with regard to claim 6, from which claim 11 is dependent. The rejection of claim 11 is not sustained.

CONCLUSION

The rejection of claims 1-3 as being anticipated by Forrester is sustained.

The rejection of claim 5 as being anticipated by Forrester is not sustained

The rejection of claims 1 and 2 as being anticipated by Akgun is sustained.

The rejection of claims 3 and 5 as being anticipated by Akgun is not sustained.

The rejection of claims 1-3 as being unpatentable over Forrester is sustained.

The rejection of claims 3 and 5-10 as being unpatentable over Akgun is not sustained.

The rejection of claims 4 and 11 as being unpatentable over Forrester in view of Lyon is not sustained.

The decision of the examiner is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

NEAL E. ABRAMS
Administrative Patent Judge

JOHN P. McQUADE
Administrative Patent Judge

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